



Fermilab

**Particle Physics Division
Mechanical Department Engineering Note**

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Project Internal Reference:

Project: E906 Beamline

Title: E906 Preparation Work in NM2 Effort Estimate

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Reviewer(s):

Key Words: NM2 Reconfiguration, KTeV

Abstract Summary:

E906, if located in the KTeV hall, will need to transport primary beam through NM2 and NM3 to a target at the upstream end of the KTeV. Minimum beam pipe diameter is 3 inches, but 4 inches is preferred. This engineering note attempts to estimate the labor resources needed to open apertures in existing constrictions and to make minor beam transport element re-configurations identified by Chuck Brown during an area walk-thru on October 1st with Jim Kilmer, Rick Coleman, and the author.

Labor estimates are based on the author's experience when he served as the project engineer for KTeV. While existing drawings have been reviewed to understand the scope, much of the effort durations are based on memory of what it took to install elements in the mid 1990's for KTeV.

Applicable Codes: n/a

Effort Estimate:

Task	Duration (hours)	Labor Source	Comments
Contractor Orientation	8	rigging crew	Assumes new crew who all need sub-contractor orientation
Open NM2 Hatch and Remove Shielding	4	rigging crew	Requires Mobile Crane, 5 man-crew
Install lateral transport cart and rails from NM2 crane to hatch	4	rigging crew	Need to ask Erickson/Voirin about what remains from 12 years ago
Remove 12 red painted concrete D blocks	3	rigging crew	Remove to gain access to collimator, etc, Need mobile crane
Remove Loose equipment (vacuum pumps, heaters, SEED monitor, etc)	2	rigging crew	Remove to create safe work area and clear egress path obstructions, Need mobile crane
Remove Blue T-type Collimator	2	rigging crew	Remove to eliminate aperture restriction, Need mobile crane
Remove Beam Calibration Table and Be Blocks	1	rigging crew	Remove to eliminate aperture restriction, Need mobile crane
Remove Target Pile Shielding Above Dump	16	rigging crew	Remove to access dump, Remove to eliminate aperture restriction - need to find lifting fixture, Need mobile crane
Remove Beam Dump in Target Pile	4	rigging crew	
Remove Shielding above Early Sweeper Magnet	16	rigging crew	Remove to access sweeper magnet, Remove to eliminate aperture restriction - need to find lifting fixture, Need mobile crane
Remove Early Sweeper Magnet	6	rigging crew	
Replace Target Pile Shielding Over target Chase	20	rigging crew	Replace because it is less work than hauling off to disposal
Lift E-8 Hyperon Magnet and remove Hilman Rollers, Lower magnet by 2 to 6 inches	6	rigging crew	Move to eliminate aperture restriction To allow the upper return steel to be moved
Remove Tie Rods in E-8 Magnet	2	rigging crew	
Raise 9 upper E-8 magnet steel segments by 8 inches and leave on cribbing	8	rigging crew	Move to eliminate aperture restriction
Raise Upper Coil for E-8 magnet and shim up 6 inches	2	rigging crew	Move to eliminate aperture restriction
Remove Radioactive Water System from NM2	2	rigging crew	Remove to allow the mu sweep II magnet to be moved to SW
Move Mu Sweep II magnet 2 feet west and 3 feet south.	4	rigging crew	Move to eliminate aperture restriction
Remove Slab collimator from d.s. end of enclosure	2	rigging crew	Remove to eliminate aperture restriction
Remove Target Station	4	man crew Mechanical tech two	Clears way for new beam pipe.
Remove instrumentation u.s. of target station	4	man crew	Clears way for new beam pipe.
Remove d.s. B2 magnets and move it upstream	4	rigging crew	Clears space for Quads
Move 2 downstreammost 4Q magnets to just u.s. of target pile.	8	rigging crew	Move quads to match beam sheet
Relocate moved B2 magnet to space cleared by moving quads	4	rigging crew	Clears aisle, puts magnet beam pipe around beam.
Install beam pipe through target pike chase	8	Vacuum tech 2 man crew	Includes adding unistrut beam pipe stands in target chase.
Install beam pipe through e8 magnet,'	2	Vacuum tech 2 man crew	

Fabricate and Install beam pipe stands every 10 feet from E8 to B4 magnets	8	Mechanical tech two man crew	
Install beam pipe from E8 to B4 magnets	8	Vacuum tech 2 man crew	
Install beam pipe in space where slab collimator was	2	Vacuum tech 2 man crew	Assumes no modifications to an existing length of pipe
Button up and leak check vacuum beam pipe in NM2	24	Vacuum tech 2 man crew	
Remove lateral transport cart and rails between hatch and NM2	3	rigging crew	
Re-stack hatch shielding and close hatch	3	rigging crew	Requires Mobile Crane, 5 man-crew
Rigging time, Sub total	134	crew-hours	
Mechanical Tech time, sub total	16	crew-hours	
Vacuum tech time, sub total	44	crew-hours	